PRACTICAL EXERCISE

AN/TYC-39 Space Division Subscriber Functional Analysis

INTRODUCTION:

This practical exercise is divided into two parts. In Part One your learning objective is to install space division subscribers by determining the correct signal path; populating, strapping, and aligning modems; and patching if necessary within 90 minutes. In Part Two you must correctly answer 14 out of 20 questions pertaining to Space Division subscriber functional analysis within 1 hour.

ITEMS YOU WILL NEED FOR THIS LESSON:

Check your work position and make sure that you have the following items. If any are missing, call your instructor.

a. AN/TYC-39.

b. TM 11-5805-790-12-6,7.

c. Oscilloscope.

d. Digital multimeter.

e. Jewelers screwdrivers.

THE LESSON STRATEGY:

Part One of this practical exercise directs you to install space division subscribers. You must determine the correct signal path and populate, strap, and align modems accordingly. Also you must perform patching if necessary. In Part Two you are directed to answer questions pertaining to Space Division subscriber functional analysis. The primary aid you will use is TM 11-5805-790-12-6,7.

Whenever pronouns or other references denoting gender appear in this document, they are written to refer to either male or female unless otherwise indicated.

APPLICATION:

1. In Part One, you will install space division subscribers. You will be given information about where the signal will enter the signal entry panel (SEP) and other classmarks of the circuit to be installed. Based on this information, you will select the type modem to use, correctly strap the modem, insert it into the correct modem slot, and make the proper alignments on the card. You will also select the correct LTU and LKG to complete the signal path.

2. In exercise 4, you will make changes in a signal path because of a defective modem slot. This will require you to perform patching procedures.

3. Your instructor will initial your PE after you have successfully completed each of the space division subscriber installation exercises.

4. In Part Two, answer the multiple choice questions by drawing a circle around the correct answer.

5. If it is not clear what you are required to do, ask your instructor for clarification.

6. When you have completed the practical exercise, ask your instructor to grade it for you.

PART ONE:

Using the AN/TYC-39, TM 11-5805-790-12-6, and Signal Connections chart, install the following Space Division subscribers. Your instructor will initial your PE when you have successfully completed each exercise.

Exercise 1.

You have a UGC-74 teletype circuit to install. The signal will enter your SEP on J11, pairs 3 and 4 (QUAD 2); 150 baud; asynchronous/normal; COMSEC = KG-84A. With this information, list and perform the additional steps to complete the circuit installation.

a. Modem type:

b. Modem slot(s) and address to populate the card(s):

c. Strapping options:

Interface option:

Mode option:

Baud rate:

Strap the modem for these options and insert in the correct modem slot(s).

d. LKG location:

e. LTU location:

f. Adjust the transmit signal level to read -4.0 dB.

g. Adjust the transmit carrier alarm to 2.0 vdc.

Instructor's initials:

Exercise 2.

You have a UGC-74 teletype circuit. The signal will enter your SEP on J13, pairs 5 and 6 (QUAD 3); 1200 baud; asynchronous/normal; equalizer in; master; COMSEC = KG-84A. With this information, list and perform the additional steps to complete the circuit installation.

a. Modem type:

b. Modem slot(s) and address to populate the card(s):

c. Strapping options:

Interface option:

Equalizer option:

Mode option:

Baud rate:

Transmit data:

Transmit clock:

Receive data:

Receive clock:

Strap the modem for these options and insert in the correct modem slot.

d. LKG location:

e. LTU type/slot:

f. Adjust the transmit signal level to -4 dB.

g. Adjust the transmit carrier alarm level to 2.1 vdc.

h. Adjust receive signal level to -4 dB.

Instructor's initials:

Exercise 3.

You have a computer terminal circuit. The signal will enter your SEP on J12, pairs 1 and 2 (QUAD 1); 16kb/s; master; COMSEC = KG84 A. With this information, list and perform the additional steps to complete the circuit installation.

a. Modem type:

b. Modem slot(s) and address to populate the card(s):

c. Strapping options:

Mode option:

Bit rate option:

Strap the modem for these options and insert in the correct modem slot.

d. LKG location:

e. LTU location:

Instructor's initials:

Exercise 4.

In exercise #1, you were assigned the following circuit information: Incoming signal on J11, pairs 3 and 4 (QUAD 2). You discover that you have a defective modem slot for this normal through circuit. You have been assigned to use Modem 4 instead. Use the same modem card as before. Perform the correct patching procedure for this circuit to have connectivity.

Instructor's initials:

PART TWO:

MULTIPLE CHOICE: CIRCLE THE CORRECT ANSWER.

1. The modem cards are installed in nest rack:

   a. A23, rows A1 and A2.
   b. A23, rows A2 through A5.
   c. A25, rows A1 through A7.
   d. A56, rows A1 and A2.

2. What slot is used for modem 40 with a Type I modem:

   a. A23A440
   b. A23A513
   c. A23A514
   d. A23A515

3. Which of the following cards is the only card type to be installed in a left hand slot?

   a. TYP1M
   b. DILPM
   c. MOD21
   d. MOD22

4. Which of the following is an operational strapping option for a Type I modem?

   a. Interface
   b. Mode
   c. Baud rate
   d. All of the above.

5. On a Type I modem, which of the following strapping options would you choose for 150 baud?

   a. J11 to J12
   b. J12 to J13
   c. J14 to J15
   d. None of the above.

6. On a MOD22 card, how would you strap the card for master?

   a. J2 to J3
   b. J3 to J4

c. J5 to J6
d. J6 to J7

7. If you strapped a MOD22 card from J9 to J10, what would you be strapping for?

a. Normal transmit clock
b. Slave
c. 1200 baud
d. Normal transmit data

8. If you strapped a MOD21 card from J3 to J4, what would you be strapping for?
a. Equalizer in
b. Equalizer out
c. LKG
d. 150 baud

9. How many strapping options are there on a MOD22 card?

a. 2
b. 4
c. 6
d. 8

10. If you strapped a DILPM card from J3 to J4, J6 to J7, J9 to J10, what would you be strapping for?

a. Master
b. Slave
c. 16 kb/s
d. 32 kb/s

11. Which of the following would you choose to strap a DILPM for the Master mode?

a. J11 to J12
b. J12 to J13
c. J13 to J14
d. J14 to J15

12. The Type I modem must be connected to the subscriber when performing alignment procedures.

    a. True
    b. False

13. Which of the following transmit levels on a Type I modem would fall within the acceptable range?

    a. +4 dB
    b. -4 dB
    c. -11 dB
    d. -12 dB

14. What test points (TP) on a Type I modem are tested for the transmit signal level?

    a. TP4 and TP20
    b. TP4 and TP21
    c. TP5 and TP26
    d. TP5 and TP30

15. Which pot on the Type I modem is used to adjust the transmit signal level?

    a. R2
    b. R3
    c. R4
    d. R5

16. Which of the following is an acceptable transmit signal level on a Type II modem?

    a. +7 dB
    b. -4 dB
    c. +11 dB
    d. -32 dB

17. What test points are tested when measuring the receive signal level on a Type II modem?

    a. TP4 and TP15
    b. TP4 and TP21

c. TP4 and TP25
d. TP17 and TP26

18. To adjust the receive carrier alarm level on a Type II modem, which pot is used?

a. R10
b. R12
c. R82
d. None of the above.

19. What is the correct measurement your multimeter should read for the receive carrier alarm on a Type II modem?

a. 1.0 vdc
b. 1.3 vdc
c. 2.3 vdc
d. 2.1 vdc

20. What test points are used when measuring the receive carrier alarm level on a Type II modem?

a. TP4 and TP15
b. TP11 and TP21
c. TP11 and TP25
d. TP12 and TP26

END

PRACTICAL EXERCISE

AN/TYC-39 Communications Equipment Support Group (CESG) Space Division Fault Isolation and Repair

INTRODUCTION:

This practical exercise is divided into two parts. In Part One your learning objective is to identify and analyze fault messages and printouts displayed on the VDU and LPU. Your instructor will induce the faults that will generate these fault messages/printouts. With this information you will utilize the fault isolation flow charts, utilize cable diagrams, perform loopback (LPBK) tests to isolate faults, and repair those faults. After you make the repairs, you will place the channel back in service to verify the fault has been corrected. You will have 1 hour and 45 minutes to perform these tasks. In Part Two you must correctly answer 7 out of 10 questions pertaining to CESG fault isolation and repair within 1 hour.

ITEMS YOU WILL NEED FOR THIS LESSON:

Check your work position and make sure you have the following items. If any are missing, call your instructor.

a. AN/TYC-39A.

b. Oscilloscope.

c. Digital multimeter.

d. Jewelers screwdriver.

e. TM 11-5805-790-12-1.

f. TM 11-5805-790-12-3.

g. TM 11-5805-790-12-4.

h. TM 11-5805-790-12-6.

i. TM 11-5805-790-12-8.

j. TM 11-5805-790-34-1.

k. TM 11-5805-790-34-3.

l. TM 11-5805-790-34-4.

Whenever pronouns or other references denoting gender appear in this document, they are written to refer to either male or female unless otherwise indicated.

THE LESSON STRATEGY:

Part One directs you to identify and analyze fault messages and printouts. Your instructor will induce the faults that will generate these fault messages. Utilize fault isolation flowcharts, cable diagrams, and perform LPBK tests to isolate and repair faults. After repairing the fault, you will place the channel back in service to verify the fault has been corrected. In Part Two you are directed to answer questions pertaining to CESG fault isolation and repair. The primary aids you will use are TM 11-5805-790-12-3 and TM 11-5805-790-12-8.

APPLICATION:

1. In Part One, your instructor will induce faults that will generate a fault message or a nonmessage fault. Utilize the fault isolation flow charts and refer to the appropriate sections in the TMs to perform the necessary procedures for fault isolation.

2. When you have identified the fault, complete the fault isolation answer sheets as instructed and repair the fault. Show your results to your instructor.

3. This is an example of how to complete your answer sheets. Fill out the entries as best as you can.

Fault: 1

Start time: Stop Time: Total Time: minutes

1. What is the symptom?

Fault Message: CHA
01-1S ......RUTCAIA . ALM MD:LRC
01 01 538201 01.0000

2. Sectionalize: Single channel alarm.

3. Localize: MODEM 1

4. Isolate: Receive carrier pot on Type II modem (R82) will not adjust. Replace modem card - modem will adjust. Alarm is gone.

5. References: TM 11-5805-790-12-8, para. 10-10
TM 11-5805-790-12-3, para. 4-8
TM 11-5805-790-12-6, para. 6-36

4. In Part Two, answer the multiple choice questions by drawing a circle around the correct answer.

5. If it is not clear what you are required to do, ask your instructor for clarification.

6. When you have completed the practical exercise, ask your instructor to grade it for you.

Fault:

Start Time: Stop Time: Total Time: minutes

1. What is the symptom?

2. Sectionalize:

3. Localize:

4. Isolate:

5. References:

Fault:

Start Time: Stop Time: Total Time: minutes

1. What is the symptom?

2. Sectionalize:

3. Localize:

4. Isolate:

5. References:

Fault:

Start Time: Stop Time: Total Time: minutes

1. What is the symptom?

2. Sectionalize:

3. Localize:

4. Isolate:

5. References:

Fault:

Start Time: Stop Time: Total Time: minutes

1. What is the symptom?

2. Sectionalize:

3. Localize

4. Isolate:

5. References:

PART TWO: MULTIPLE CHOICE: CIRCLE THE CORRECT ANSWER.

1. Which of the following alarms displayed on the VDU screen indicates a fault in the CESG?

   a. CAP
   b CHA
   c. IFS
   d. ORB

2. Which of the following procedures will generate a printout on the LPU?

   a. Pressing ACKT, followed by ACK.
   b. STAT command
   c. &NNN directive

d. All of the above.

3. If a LPBK test fails, which of the following is a probable cause of a fault?

   a. Defective circuit card
   b. Improper modem strapping
   c. Improper modem alignment
   d. All of the above.

4. What state should the line be in prior to running LPBK tests?

   a. +
   b. -
   c. OL
   d. X

5. When performing LPBK tests, which of the following LPBKs is performed first?

   a. LTU
   b. Modem
   c. Remote
   d. None of the above.

6. When following the sequence of the fault isolation flow charts and you are unable to isolate a fault, a defective cable could be the probable cause of a fault. Which of the following references gives you information about cables in the CESG?

   a. TM 11-5805-790-12-8, para. 10-10
   b. TM 11-5805-790-34-3, fig. 6-1
   c. TM 11-5805-790-34-4, table 7-1
   d. TM 11-5805-790-34-4, table 7-2

7. Using TM 11-5805-790-34-3, fig. 6-1, which of the following internal cables connects J11 of the SEP to J1 of the subscriber patch panel?

   a. W4
   b. W11
   c. W16
   d. W30

8. Which of the following internal cables connects J17 of the Red LKG patch panel to J36 for LTUs 0-4?

a. W30
b. W38
c. W48
d. W54

9. Using TM 11-5805-790-34-3, which of the following illustrates the schematic for a MOD21 circuit card?

a. Figure 6-1
b. Figure 6-26
c. Figure 6-28
d. Figure 6-33

10. What is the drawing number for the W4 internal cable?

a. SM-D-811628-2
b. SM-D-811628-3
c. SM-D-811628-4
d. SM-D-811630-2

END

PRACTICAL EXERCISE

Time Division Interface Group Modified (TDIGM)

INTRODUCTION:

In this practical exercise, your learning objective is to correctly answer 14 out of 20 written questions and populate the TDIGM nest.

ITEMS YOU WILL NEED FOR THIS LESSON:

Check your work position and make sure you have the following items. If any are missing, notify your instructor.

a. TM 11-5805-790-12 series.

b. TM 11-5805-790-34 series.

c. Card Extractor.

THE LESSON STRATEGY:

This practical exercise directs you to answer written questions and populate the TDIGM nest. The primary aid you will use is TM 11-5805-790-12 and 34 series.

APPLICATION:

1. Write the correct answer in the space provided below each question.

2. Use TM 11-5805-790-12 and 34 series manuals as your references.

3. If it is not clear what you are required to do, ask your instructor for clarification.

4. When you have completed the practical exercise, ask your instructor to grade it for you.

5. Populate the TDIGM nest.

Whenever pronouns or other references denoting gender appear in this document, they are written to refer to either male or female unless otherwise indicated.

EXERCISE:

1. What jacks are used on the SEP for circuit switch DTG interface?

   a. J1 through J5
   b. J1 through J14
   c. J10 through J20
   d. RTSA (A41) and RTSB (A-42)

2. How many data channels are associated with the TDIGM ?

   a. 48
   b. 35
   c. 50
   d. 100

3. How are most circuit cards in the TDIGM strapped?

   a. DIP switches
   b. Using jumper wires
   c. No strapping necessary
   d. Processor-controlled strapping

4. What command is used to switch from RTS-A to RTS-B?

   a. HTDM
   b. Open
   c. YAVL
   d. HEQP

5. What is the frequency of the TGMOW sync pulse?

   a. 1 kHz
   b. 1.2 kHz
   c. 100 Hz
   d. 4.096 MHz

6. What is the range of addresses on the MUX/DEMUX?

   a. 1 to 12
   b. 1 to 64
   c. 0 to 128
   d. 0 to 35

7. How many patch panels are used between the SEP and the LKG?

   a. One

b. Two
c. Four
d. Three

8. What is the input and the output of the TED connected to?

a. TGMOW
b. RTS and ATDLY
c. TGMOW and GPMDM
d. TGMOW and MXDMX

9. What characters does the Control Character Decoder look for?

a. Sync
b. Idle
c. SOC, and Idle
d. SOM, EOM, and Idle

10. What are the TED alarms signals?

a. CAL, CLR, CLK
b. CSF, FOP, SYNC
c. POF, SYNC, CLR
d. CSF, POF, CAL

11. What slots are the LTGA cards for TDGIM B?

_____

12. How are the RTS cards strapped?

_____

13. What must you check before installing any circuit card in the TDIGM nest?

_____

14. What card aligns the trunk signaling buffer with the transmission group module order wire master frame?

_____

15. What command is used to change the strapping of the NSYLK cards in the TDGIM?

_____

16. The MTGS4 card is strapped J29 to J30. What is providing the timing to the trunk?

_____

17. What card controls the switching from space division to time division?

_____

18. The GM transmits and receives what two types of modulated data?

_____

19. What channel is the overhead channel on if the HTDM command has MMTTMMM strappped?

A. 25
B. 16
C. 1
D. 0

20. What card is located in A23A114?

_____

PRACTICAL EXERCISE

AN/TYC-39 Communications Equipment Support Group (CESG) Time Division Fault Isolation and Repair

INTRODUCTION:

This practical exercise is divided into two parts. In Part One your learning objective is to identify and analyze fault messages and printouts displayed on the VDU and LPU. Your instructor will induce the faults that will generate these fault messages/printouts. With this information you will utilize the fault isolation flow charts, utilize cable diagrams, perform loopback (LPBK) tests to isolate faults, and repair those faults. After you make the repairs, you will place the channel back in service to verify the fault has been corrected. You will have 1 hour and 45 minutes to perform these tasks. In Part Two you must correctly answer 7 out of 10 questions pertaining to CESG time division fault isolation and repair within 1 hour.

ITEMS YOU WILL NEED FOR THIS LESSON:

Check your work position and make sure you have the following items. If any are missing, call your instructor.

a. Digital multimeter

b. Oscilloscope

c. Jewelers screwdriver

d. TM 11-5805-790-12-1

e. TM 11-5805-790-12-3

f. TM 11-5805-790-12-4

g. TM 11-5805-790-12-6

h. TM 11-5805-790-12-8

i. TM 11-5805-790-34-1

j. TM 11-5805-790-34-4

k. TM 11-5805-790-34-3

l. AN/TYC-39A

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THE LESSON STRATEGY:

Part One directs you to identify and analyze fault messages and printouts. Your instructor will induce the faults that will generate these fault messages. Utilize fault isolation flowcharts, cable diagrams, and perform LPBK tests to isolate and repair faults. After repairing the fault, you will place the channel back in service to verify the fault has been corrected. In Part Two you are directed to answer questions pertaining to CESG time division fault isolation and repair. The primary aids you will use are TM 11-5805-790-12-3 and TM 11-5805-790-12-8.

APPLICATION:

1. In Part One, your instructor will induce faults that will generate a fault message or a nonmessage fault. Utilize the fault isolation flow charts and refer to the appropriate sections in the TMs to perform the necessary procedures for fault isolation.

2. When you have identified the fault, complete the fault isolation answer sheets as instructed and repair the fault. Show your results to your instructor.

3. This is an example of how to complete your answer sheets. Fill out the entries as best as you can.

Fault: 1

Start time: Stop Time: Total Time: minutes

1. What is the symptom?

Fault Message: CHA
01-1S ......RUTCAIA . ALM MD:LRC
01 01 538201 01.0000

2. Sectionalize: Single channel alarm.

3. Localize: MODEM 1

4. Isolate: Receive carrier pot on Type II modem (R82) will not adjust. Replace modem card - modem will adjust. Alarm is gone.

5. References: TM 11-5805-790-12-8, para. 10-10
TM 11-5805-790-12-3, para. 4-8
TM 11-5805-790-12-6, para. 6-36

4. In Part Two, answer the multiple choice questions by drawing a circle around the correct answer.

5. If it is not clear what you are required to do, ask your instructor for clarification.

6. When you have completed the practical exercise, ask your instructor to grade it for you.

Fault:

Start Time: Stop Time: Total Time: minutes

1. What is the symptom?

2. Sectionalize:

3. Localize:

4. Isolate:

5. References:

Fault:

Start Time: Stop Time: Total Time: minutes

1. What is the symptom?

2. Sectionalize:

3. Localize:

4. Isolate:

5. References:

Fault:

Start Time: Stop Time: Total Time: minutes

1. What is the symptom?

2. Sectionalize:

3. Localize:

4. Isolate:

5. References:

Fault:

Start Time: Stop Time: Total Time: minutes

1. What is the symptom?

2. Sectionalize:

3. Localize:

4. Isolate:

5. References:

PART TWO:

1. What is the diagnostic test for the TDIGM?

   _____

2. While running TDIGM fault isolation test you get an error of 020061, what card should you repalce?

   _____

3. While running TDIGM fault isolation test you get an error of 750221, what card should you repalce?

   _____

4. While running TDIGM fault isolation test you get an error of 020010, what should you do next?

   _____

5. In what patch panel do you install the TDIGM patch plugs to connect paths from the SEP to the RTS's?

   _____

6. What is the code for TDIGM passes unconditionally?

   _____

7. What is the most likely problem if you get a printout of:

   FAIL TDIM RSY2 A ?? LOOP OFR=A5 ITR=08

   _____

8. What is the most likely problem if the TDIGM passes but DTDI gives an error code of 750XXX?

   _____

9. What must be done to the TDIGM when the fault has been corrected?

   _____
   _____
   _____
   _____

10. While running DTDI you replace all the cards associated with error code 020055 and the problem is still present, what card or cards would you replace?

_____

_____

_____

_____

PRACTICAL EXERCISE

AN/TYC-39A TIMING SYSTEM

INTRODUCTION:

This practical exercise (PE) will provide you with the time to practice and reinforce your understanding of the timing system. Your objective is to correctly answer at least 7 out 10 questions within 20 minutes.

ITEMS YOU WILL NEED FOR THIS LESSON:

Check your work position and make sure you have the following items. If any items are missing, call for an instructor.

a. Student Guide

b. TM-11-5805-790-12 series

c. TM-11-5805-790-34 series

THE LESSON STRATEGY:

This PE directs you in your practice of understanding how and where the AN/TYC-39A gets its timing for data control and message processing. The primary aid you will use is the technical manuals.

APPLICATION:

1. You will have 30 minutes in which to correctly answer 7 out of 10 question.

2. When you have completed the performance exercise, turn it into your instructor.

3. Upon completion of the performance exercise, there will be a review and question/answer period.

4. If there are no questions, you may begin.

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EXERCISE:

1. Where would you find the MTGS4 card for MTG A? (Give nest, row, and slot number.)

_____

2. What does the MTGSY card consist of (main item) and what is its function?

_____

3. What frequencies are used by the diphase loop modem?

_____

4. What frequency is sent to the CAP from the MTG?

_____

5. What card contains the Clock Monitor Unit (CMU)?

_____

6. What is the frequency sent to the MTGSY from the MTGS4?

_____

7. Where does an LTU get its timing from?

_____

8. Where do the VDT controllers get their timing from?

_____

9. To what units does the MCBM card supply clocks?

_____

10. What clock does a Type II modem require?

_____

SUMMARY:
You have just demonstrated your ability to describe the timing system of the AN/TYC-39A.